AMSTRAD
CPC 6128

THE DDP™ ART STUDIO

USER MANUAL

Vers 1.3.

The ART STUDIO is protected by LENSLOK and full instructions are enclosed.

WARRANTY (What to do if it doesn't work !)

IF this program is faulty or fails to load, please return it (without the packaging) to the address below and it will be replaced free of charge, and your postage refunded. This offer does not affect your statutory consumer rights.

RAINBIRD SOFTWARE
Wellington House
Upper St. Martin's Lane
London
WC2H 9DL

WARNING

Program and documentation written by James Hutchby
Copyright E.E.C. Ltd 1986

THE DCP™ ART STUDIO

AMSTRAD
CPC 6128

FEATURES

* Operates in Modes 1 and 2.
* Windowns - icons - pull down menus - pointing devices.
* All information on screen.
* Works with keyboard, joystick or mouse.
* Dot matric printer dumps - 25 sizes in grey scale.
* Supports Amstrad and Epson compatible printers and includes user definable option.
* Save, load and merge pictures and fonts to disc.
* 16 pens, variable-flow airbrush, 16 user-definable brushes.
* Undo facillity.
* Windows can be cleared, inverted, cut and pasted, enlarged, reduced, squashed, stretched, flipped and rotated.
* Solid fill.
* Textured fill - 32 user definable patterns.
* Wash texture facility.
* 3 levels of magnification with pixel edit pan and zoom.
* Text - 9 character sizes, 2 directions, bold, rotate font.
* Font editor - clear, invert, flip, rotate characters or whole font, copy ROM, capture font from windown.
* Lines, rectangles, triangles, circles and rays.
* Elastic shapes.
* Full range of colours.
* Co-ordinates displayed.

CONTENTS

How to load ART STUDIO

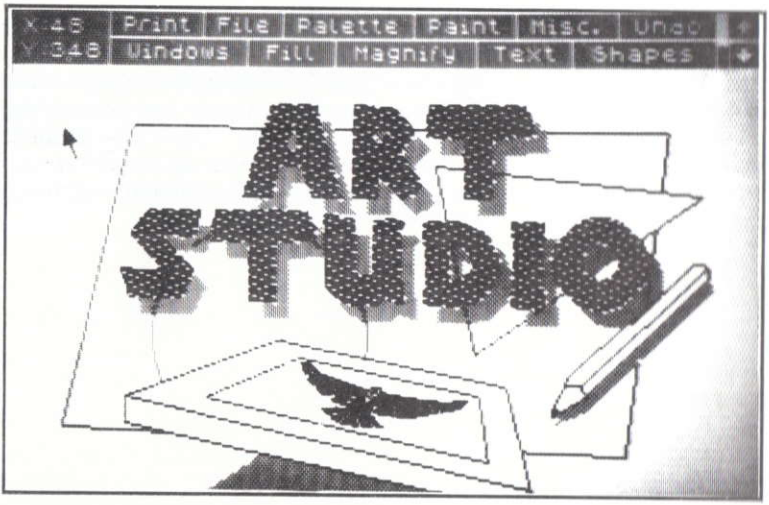
Reset your CPC6128 by pressing the CONTROL, SHIFT and ESC keys together. Insert SIDE A, of the supplied disc, into the drive and enter the command RUN "studio"

How to use this manual

Before using ART STUDIO, it is suggested that you read the Introduction immediately below, which explains the basics of the program and how to control it. This will prepare you enough to enable you to begin using your copy of ART STUDIO. Explore the program at your own pace, aiming to get a 'feel' for its structure and workings. Don't be afraid to experiment. Read the rest of this manual to clear up specific points and for reference. You are not expected to read the manual all the way through before using the program for the first time.

Introduction

ART STUDIO is built upon the 'windows - icons - mouse - pointing device' concepts as pioneered by Xerox at Palo Alto and popularised by Apple with the Lisa and Macintosh computers. The guiding philosophy behind these developments is that a program should be easy for the first-time user to operate, with all relevant information 'on screen', and no complicated keyboard sequences to learn. Instead, commands are given by simply 'pointing' at options in screen menus.



When you first run ART STUDIO, you will be presented with a clear screen with a blue and white 'menu bar' at the top and a small black arrow in the centre (you may change the standard colours by using the palette menu - see the section covering the palette). The arrow (known as the 'pointer' or 'cursor') is the key to the program. It is controlled by the arrow (cursor) keys, pressing the left arrow key moves it to the left, pressing the up arrow key moves it up, and so on. (It is also possible to control the pointer using a joystick or mouse, but this will be covered later.) The motion of the cursor is 'intelligent', in the sense that it speeds up the longer a key is held down.

The menu bar at the top of the screen contains a number of individual boxes with headings in them. Moving the cursor to within one of these boxes and pressing the space bar (from now on known as the 'select'

button) causes a subsiduary menu to be drawn on the screen partly overlaying the main menu bar. This process is called 'pulling down' a menu. The subsiduary menu will contain a number of entries or 'options', which may lead to further sub-menus, or cause certain actions or commands to be performed. An option is chosen by moving the cursor to it (it will 'highlight' if it's available) and pressing the select button. This process is known as 'clicking' an option. If the option is a command, then what usually happens is that the pull-down menu disappears and the arrow cursor changes into a small icon which bears some relation to the command selected. For example, a paint brush when painting on the screen. The icon here is acting as a reminder of the current 'mode'. This new cursor can then be moved about the screen using the same controls as the arrow cursor. The action of the select button depends on the particular icon. For example, with the brush icon, pressing select paints pixels on the screen.

If the icon cursor is moved into the menu bar at the top of the screen, it reverts to its arrow form. However if it is moved back out again, then it returns to its icon form (unless another command has been selected in the meantime). The program will continue to stay in the current mode (with the current icon) until another mode is selected.

As mentioned above, if an option in a pull-down menu is highlighted as the cursor is moved over it, then that option is available. Options in some menus will only be highlighted if certain conditions have been met. For example, consider the Windows menu. An action can only be performed on a window, say cleared, if the window has previously been defined. Consequently, when the Windows menu is pulled down for the first time, the 'Define window' option is highlighted, but the 'Clear window' option is not. After defining the window, and pulling down the Windows menu for the second time, the above condition is met and so the 'Clear window' option becomes highlighted as the cursor is moved over it.

Some menus contain options which are neither commands nor lead to sub-menus. These are known as flags or 'switches' - devices which can be in one of two states, on or off. These switches generally modify the behaviour of other options in the same menu. For example, there is a switch in the Text menu which controls whether characters are printed sideways or not. The on state is represented by a tick, and the off state is represented by a cross. A switch can be changed state ('toggled') by moving the cursor to it and pressing select.

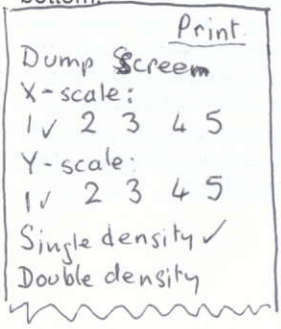
Often there is a choice in a menu between two or three ways of doing something. For example, there are three sizes in which characters can be printed, either 'Normal height', 'Double height', or 'Treble height'. These are shown as three separate options in the Text menu, only one of which is marked with a tick, the others being unmarked. The tick indicates which height currently applies. The height can be changed by moving the cursor to one of the unmarked options and pressing select.

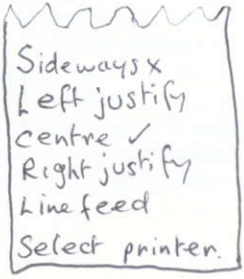
A full CPC6128 screen is 25 'lines', but the menu bar permanently occupies 3 of these lines. You may think then that you are limited to designing pictures that fit in the remaining 22 lines. However, this is not the case. The two boxes in the menu bar with arrows in them allow you to 'scroll' the visible part of the screen over a full 25 lines. Clicking one of the arrow boxes scrolls the screen by one line, clicking it three times scrolls it by the full amount. The small white bar immediately to the left of the arrow boxes shows which part of the whole screen is currently being displayed.

To remove or collapse a menu pulled down by mistake, just move the cursor outside of it and press select.

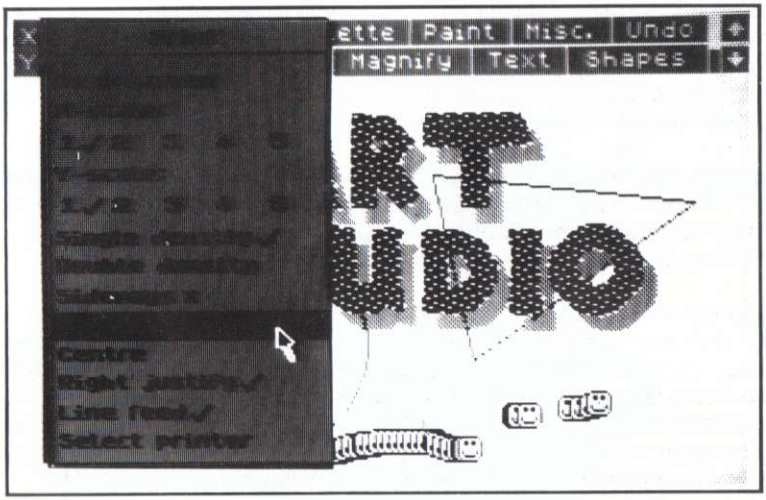
ART STUDIO supports the medium-res and the hi-res screen modes available on the CPC6128. The number of inks and the number of pixels are different in the two modes (a 'pixel' is a single dot on the screen, the smallest picture element). In mode 1, four colours are available at a resolution of 320 horizontal by 200 vertical pixels. In mode 2, two colours are available at a resolution of 640 horizontal by 200 vertical pixels. In mode 1 the pixels are square, in mode 2 they are half-width. Note that the SHIFT key can be used in conjunction with the direction keys (cursor keys) to move the cursor a single pixel at a time.

The rest of this manual is divided into sections, each section covering one of the options in the main menu bar. The sections logically follow the same order as this menu, reading from left to right, then top to bottom.





PRINT



This menu allows you to take a hard copy, or 'dump' as it is called, of your finished picture on a dot matrix printer capable of bit image graphics. Various sizes of printout are available via independently adjustable horizontal and vertical scaling factors. The horizontal or X-scale corresponds to the number of dots across the printer paper to one pixel on the screen, and the vertical or Y-scale corresponds to the number of dots down the paper to one pixel on the screen. For example, if the X-scale was set to 2 and the Y-scale to 4, then each pixel on the screen would be represented by a block of 2 by 4 dots on the paper. Note that the actual physical dimensions of the printed dots varies from printer to printer. Some experimenting will be necessary to get the best 'aspect ratio' for a particular printer, so that circles on the screen appear as circles on the printout and not as ellipses.

Not all of the sizes of printout will necessarily be possible with the particular printer you are using, it depends on the total number of dots the printer is capable of resolving across a page. If a particular sized dump is available, then the 'Dump screen' option in the Print menu will be highlighted as the cursor is moved over it. If it isn't highlighted, then you must try a smaller X-scale factor, or turn the 'Sideways' switch on (see below). Note that a mode 2 screen dump needs at least

640 dots across the page if not in sideways mode.

ART STUDIO uses 'stipples' - arrangements of dots of varying density - to represent the different inks on the CPC6128's screen. In mode 1 four stipples are used, in mode 2 only two are needed. The stipples are matched to the grey-scales of the inks, so that the lightest ink is represented by the least dense stipple, and so on.

As each pixel is sent to the printer, it is echoed to the screen. A dump can be aborted at any time by pressing the ESC key. Note that your printer may need resetting (just turn it off and then back on again) if you stop it when it's in the middle of printing a line.

Most dot matrix printers capable of bit image graphics can operate in two different graphics modes known as single density and double density. The resolution in the latter mode is generally greater than that in the former, i.e. more dots can be printed across the page. You can switch between these two modes from the Print menu. Some of the dump sizes not available in single density mode may become available in double density mode as a consequence of the increased resolution.

It is possible to print a picture sideways, from left to right, rather than from top to bottom. Because the CPC6128 screen has a smaller height than width, it may be possible to make a larger dump in sideways mode than would otherwise be available.

The three options 'Left justify', 'Centre', and 'Right justify' determine whereabouts across the page a dump is situated, either hard against the left-hand edge, in the centre with equally spaced margins, or hard against the right-hand edge. The tick indicates which option applies.

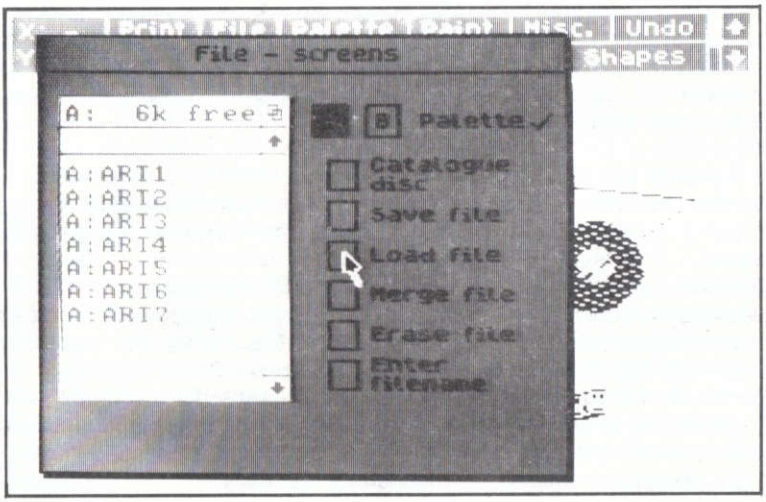
If your printer automatically generates a line feed after receiving a carriage return, then you must ensure that the 'Line feed' switch near the bottom of the menu is turned off (otherwise you will find your printout consists of alternate lines of dots and spaces). If it doesn't, then leave the switch turned on.

The final option in the Print menu pulls down a menu listing the printers supported directly by ART STUDIO. Click the entry for the printer you are using.

It is possible to extend the system to support a printer not included in this menu, the 'User-defined' printer. On booting, ART STUDIO looks for

a printer definition file on the disc and loads it if found. This file contains the necessary codes to control the printer. Consult Appendix 1 to learn how to construct such a file.

FILE



ART STUDIO fully supports discs for the storage and retrieval of pictures (known as 'files'). It has the ability to maintain a RAM-based catalogue, that is a catalogue that is stored permanently in memory and can be displayed and accessed without the need to actually read the disc each time. To generate the catalogue for a disc, move the cursor to the box alongside 'Catalogue disc' and press select. The drive motor will start, and after a few seconds the large white box on the left-hand side of the screen will fill with information. At the top of the box is the free space on the disc in kilobytes, and below that a list of filenames (assuming that you have a disc with some picture files on it).

You may notice that only certain files on a disc are displayed in the RAM catalogue - specifically only those files that have the filetype extension .SCR (for screen) to their filenames (although this extension is not actually displayed on screen in the File menu). These files can be highlighted by pointing the cursor at their filenames and pressing select. A highlighted file can then be saved, loaded, merged or erased

by moving the cursor to the box alongside the desired operation, and pressing select again. This is a considerably more convenient and elegant means of file handling than the typing of commands and filenames in at the keyboard.

The total capacity of the RAM catalogue is 56 entries, although only 10 can be displayed at any one time. The up-arrow and down-arrow boxes, however, allow you to scroll through the whole catalogue to find a particular entry. The box with the linked squares symbol (the 'home' symbol) moves you back to the start of the catalogue, and the bar between the two arrow boxes shows which part of the whole catalogue is currently being displayed.

A filename can be entered at the keyboard when a file is being saved for the first time (and hence doesn't appear in the RAM catalogue) by moving the cursor to the box marked 'Enter filename' and pressing select. A prompt will appear requesting a filename. Type in the filename (up to 8 characters) and then press ENTER (pressing ENTER on a empty line aborts the operation). You do not need to actually type in the filetype extension when saving a file, it will be appended automatically (although the default can be overridden if required). If a drive is not specified (A or B), the current drive will be used (highlighted at the top of the File menu). It is possible to load files which do not appear in the RAM catalogue, because they don't have the right filetype, by entering the filenames manually.

A file can be 'merged' with the current screen contents, a process in which pairs of pixels are combined to produce a composite picture. The merging is on the same basis as the pasting of a window - refer to the Windows menu. Note that palettes are not merged (see below).

A file can be erased from a disc by highlighting it in the RAM catalogue or entering its filename manually, and then clicking the box by the 'Erase file' option. Confirmation is sought before proceeding. Note that, although the name of an erased file is removed from the RAM catalogue, the free space is not updated. Therefore a disc should be re-catalogued afterwards if an accurate value is required.

Note that files can be saved or loaded by first clicking the save or load boxes and then highlighting the filename. This is the recommended order as it removes the possibility of saving a file when loading was intended, and vice versa. A filename can be un-highlighted by selecting it for a second time.

To keep a complete record of a finished picture, it is necessary to save the current palette alongside the actual screen contents (see the section covering the Palette menu for a description of what the palette is). To do this, simply set the 'Palette' switch at the top right of the File menu to on before saving a screen. The palette will then be saved as a separate file with the same first name part as the screen file, but with the filetype extension .PAL. For example, if you saved a screen with the palette switch on, using the name MYPIC, then your disc would contain the files MYPIC.SCR and MYPIC.PAL.

The current screen mode is also saved in the palette file, and when a screen and its palette are loaded back into ART STUDIO, the program will automatically put itself into the correct mode. Loading a file with the palette switch off will not change the screen mode, nor will it change the current palette. Erasing a screen file with the palette switch on also erases the associated palette file (if it exists).

ART STUDIO supports the additional FD1 disc drive that can be connected to the CPC6128. To catalogue a disc in the second drive, click the 'B' box at the top of the File menu, then click the 'Catalogue disc' box. The free space on the disc in drive B will be displayed below that for the disc in drive A. The RAM catalogue will contain files from both discs, the drive number preceding the actual filename. When a highlighted file is saved or loaded therefore, ART STUDIO knows which drive to use.

Note that ART STUDIO will only load files of the binary type, and will not load a screen file if its length is greater than 16384 (4000 hex) bytes. Some sample pictures are included on the supplied disc. If you load a screen into ART STUDIO that has been created under another art package or from BASIC, then it must have a zero offset, i.e. the screen must not have been hardware rolled.

Filetypes .SRN and .PIC are also recognised by ART STUDIO and will appear in the RAM catalogue. Only files in USER 0 are displayed, but files can be saved and loaded to other user areas by including a user number in a manually entered filename.

Because the CPC6128 disc operating system automatically maintains a one-level backup for files (with filetype extension .BAK), when overwriting a file to a nearly full disc, it may be necessary to erase the previous version before saving the new version.

A similar File menu is used to load and save character fonts. In that menu, naturally, only font files are displayed in the RAM catalogue. Note that you do not have to catalogue a disc separately in each File menu, catalogue in one and the other is updated automatically (since only one RAM catalogue is actually used internally).

Pictures you have created using ART STUDIO can be loaded back from BASIC with the commands:-

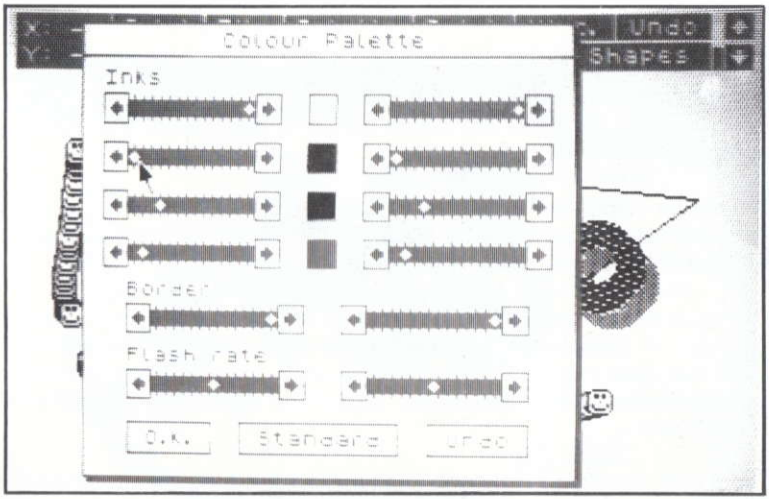
MODE 1: LOAD "picture.scr",&C000 for mode 1 screens or
MODE 2: LOAD "picture.scr",&C000 for mode 2 screens.

To load a picture and its associated palette, you could use a program such as the following:-

```
10  x=HIMEM
20  MEMORY x-13
30  LOAD "picture.pal",x-12
40  MODE PEEK(x-12)
50  FOR a = 0 to 3
60  INK a,PEEK(x-11+2*a),PEEK(x-10+2*a)
70  NEXT
80  BORDER PEEK(x-3),PEEK(x-2)
90  SPEED INK 6*PEEK(x-1)+1,6*PEEK(x)+1
100 MEMORY x
110 LOAD "picture.scr",&C000
120 GOTO 120
```

You will find this program on the disc under the filename "LOADER".

PALETTE



The palette is one of the most interesting features of the Amstrad CPC6128. A total of 27 physical colours can be displayed by the video circuitry in the machine, but only a relatively small number of these colours can be on the screen at the same time (four colours in mode 1, or two colours in mode 2). So, instead of referring directly to colours when working on the screen, we deal with 'inks'. These are 'logical' rather than physical colours. Each ink is linked to one of the available colours, but the links are not permanent. Changing the links will actually change the colours that appear on the screen. The Palette menu allows you to set up these links to the colours you want.

The menu contains a number of 'scroll bars', each with graduations representing the 27 colours available on the CPC6128. The diamond indicator shows which is the current colour. The indicator can be moved along a scroll bar (and the colour changed) by clicking the arrow boxes at its ends.

Two colours are associated with each of the four inks, and the CPC6128 operating system flashes between the two at a determined rate. The left-hand of each pair of scroll bars sets the first colour, and the right-hand sets the second colour. Note that the right-hand bar automatically tracks the left-hand one. Therefore, if you don't want flashing, use the left hand bar to set your ink. To set flashing between

colours just set the first colour on the left-hand scroll bar, then set the second colour on the right-hand bar.

In addition to clicking the arrow boxes to change an ink, you can also click on the scroll bar itself. If the cursor is moved to the left or right along a scroll bar while the select button is held down, the indicator will move with it.

The border colour can also be changed from the Palette menu, using the scroll bar pair below those for the four inks. Again two colours can be set, controlled by the same flash rate as the inks.

The final pair of scroll bars determines the rate of flashing between the pairs of colours for the four inks and the border. The left-hand scroll bar sets the time for the first of each pair, and the right-hand bar sets the time for the second. Again the right-hand bar will track the left-hand one.

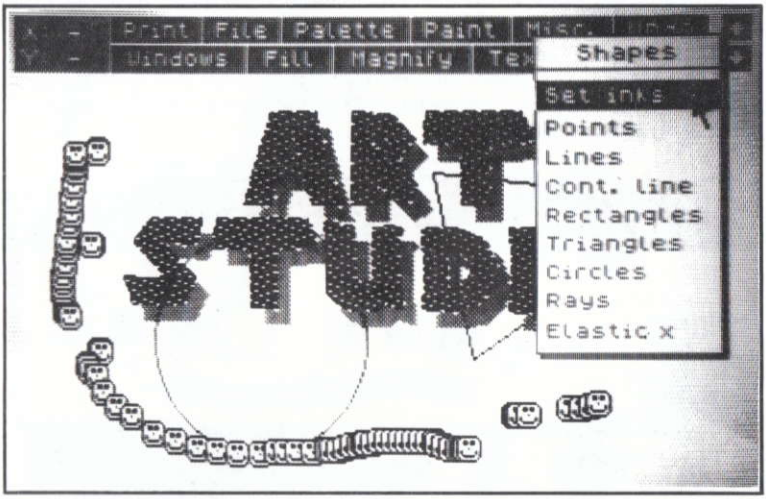
The 'Undo' option cancels any changes made to the palette since the Palette menu was last pulled down.

The 'O.k.' option is the exit from the Palette menu, and confirms the new choice of palette.

Finally, 'Standard' sets the palette back to its default or initial state, specifically white, black, red and blue inks, white border, no flashing. Pressing the ESC key also restores the palette to its standard state. This key is useful to remember if you accidently set two inks to the same physical colour and lose sight of the cursor!

It is perhaps best to design your pictures using the standard colours, and then adjust the palette at the end just before saving the screen. This will ensure that all the pull-down menus are legible, since, with some arrangements of colours, they would not be.

INKS



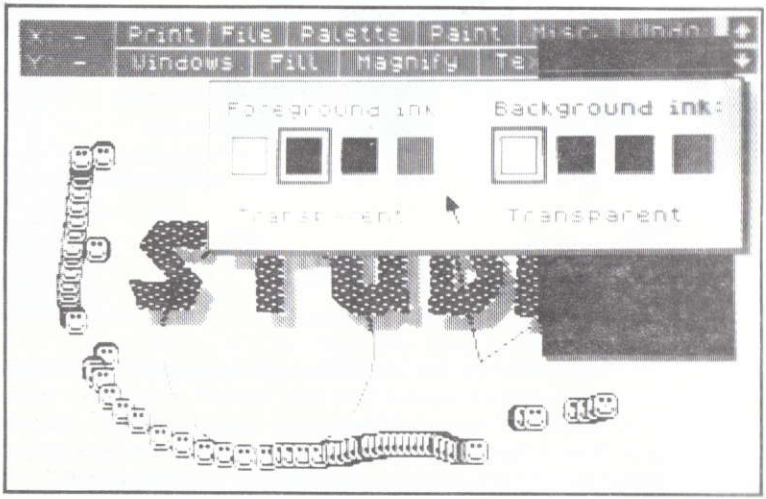
For the sake of convenience, the Inks menu can be reached from most of the main pull-down menus via the 'Set inks' option. The menu allows two inks to be defined, a foreground ink and a background ink. Each ink can be set to one of four colours or to transparent (in mode 2 the third and fourth colours are the same as the first and second colours). The outlines around the boxes indicate which inks are current.

The foreground ink is used to specify an ink for most of the drawing that is done on the screen. For example, all shapes are drawn in the current foreground ink, and all pens paint in the current foreground ink. The background ink is used, for example, to specify an ink when clearing a window, or to specify the background of characters printed on the screen.

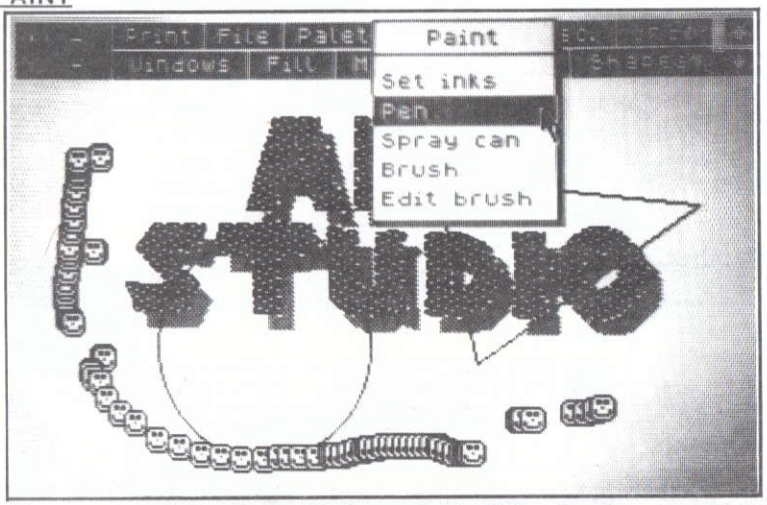
The Inks menu is also used to specify inks where the terms foreground and background don't have any literal meaning. For example, when swapping two inks within a window on the screen, the inks are defined via this menu.

A 'transparent' ink is one which leaves the screen unchanged when anything is drawn. For example, printing text with a transparent background ink allows the existing pixels between the characters to show through.

Note that you can pull down the Inks menu to change the foreground and background inks without losing the 'mode' you are in, in other words the cursor icon doesn't change.

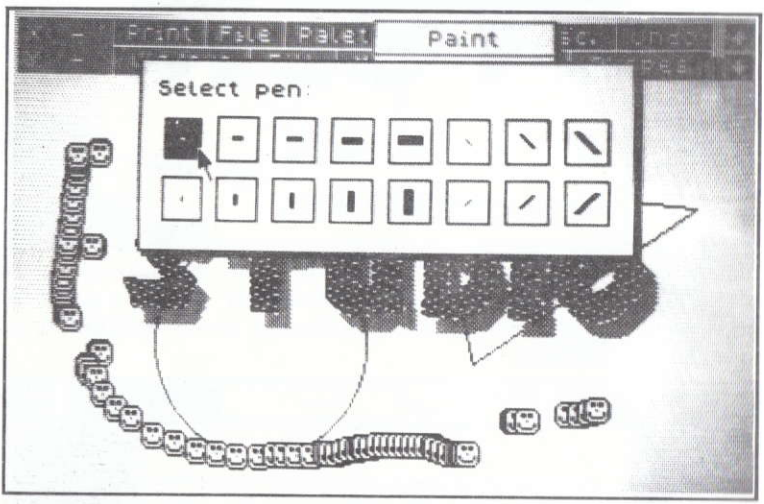


PAINT

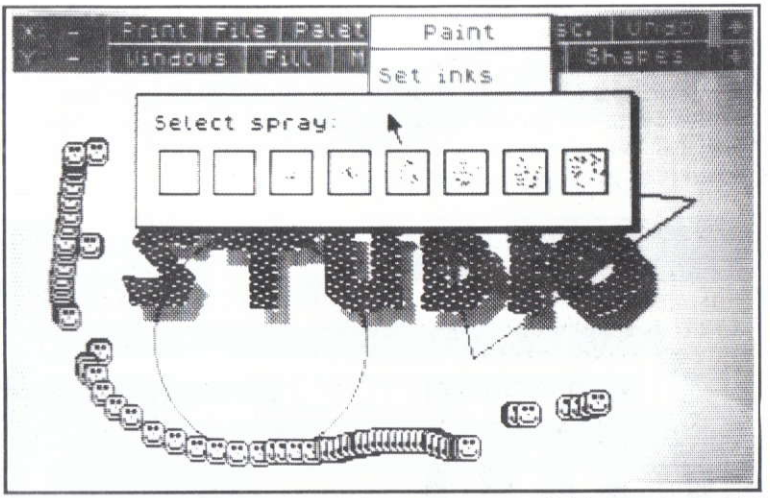


This menu controls some of the main facilities for drawing on the screen. It provides access to three different 'tools' - a pen, a spray can and a brush. In addition, it allows brushes to be re-designed to suit individual requirements.

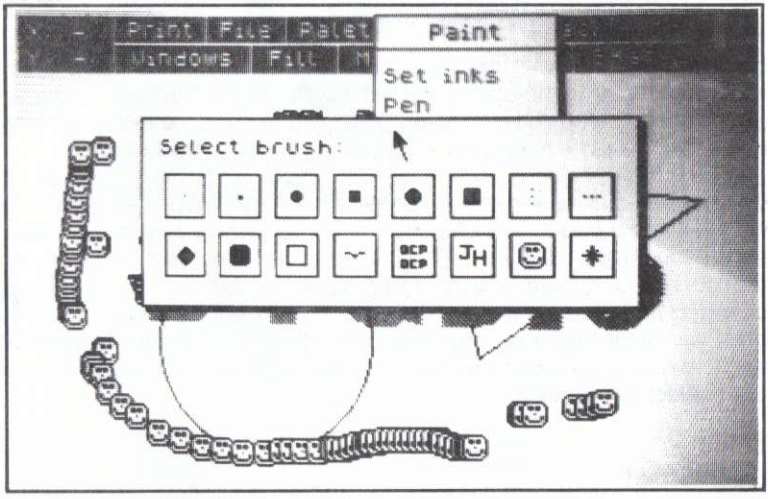
Sixteen pens of various shapes and sizes are available. To use a pen, move the cursor down the Paint menu until the 'Pen' option is highlighted, press select to pull down a menu containing the different pens, choose one by pointing at it with the cursor, then press select again. The arrow cursor will be replaced by a representation of a pen. This cursor can then be moved about the screen and pixels painted with it by pressing select. It paints in the current foreground ink. If the select button is held down as the cursor is moved, continuous lines can be painted.



Pens can also be used as erasers, there being no real distinction between the two. For example, suppose you were constructing a diagram in red after having cleared the screen to blue. To draw the elements of your diagram, you would use one of the pens with the foreground ink set to red. Now suppose you made a mistake and wished to remove part of your drawing. You would simply change the foreground ink to blue, and continue using the same pen to draw over the mistake.

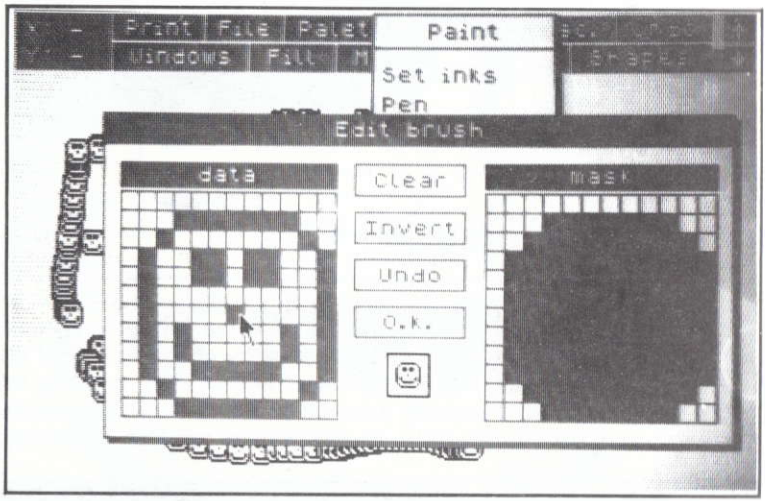


Eight spray cans with a range of diameters are available, each of which sprays a random pattern of dots on the screen in the current foreground ink. You can demonstrate this random nature by choosing one of the larger sprays, and holding down the select button while keeping the spray can in one place. Eventualy a solid disc will be drawn. The spray may of course be moved as it is painting to product graffiti-like effects.



Finally, sixteen brushes of various sizes and designs are available.

Each brush has associated with it a 'mask', which has the same dimensions as the brush itself. When a brush is used to paint on the screen, first the pixels corresponding to the mask are set to the current background ink, then the pixels corresponding to the brush itself are set to the current foreground ink. The advantage of having a mask is that it allows more complex designs to be painted, but for simple brush patterns it can just be ignored.



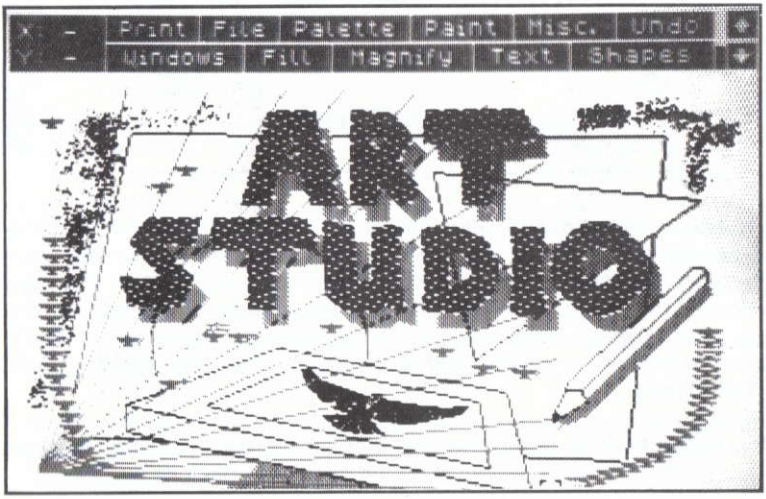
Each of the sixteen brushes can be edited to taste. To edit a brush, move the cursor to the option marked 'Edit brush' in the Paint menu, and press select to pull down a menu containing large scale representations of the brush and its mask and a copy of the brush at normal size.

The individual pixels in the enlarged brush and mask can be altered with the arrow cursor. Positioning the cursor over a pixel and pressing select will toggle the pixel. Then, as long as select is held down, and the cursor is moved about, other pixels under the cursor will be changed in the same way as the first. For example, clicking on a set pixel will reset that pixel and reset any others until select is released, and clicking on a reset pixel will set the pixel and subsequent pixels until select is released.

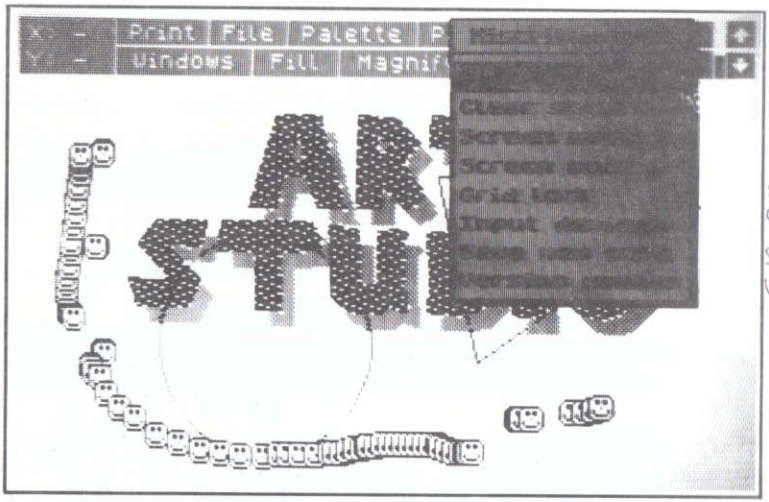
A couple of additional facilities are provided in this menu to make editing easier. They are, 'Clear' which resets all the pixels in the brush and its mask, and 'Invert' which toggles all the pixels in the brush and mask. The 'Undo' option cancels any changes made to the brush and mask since the edit menu was last pulled down.

The newly edited brush can be painted with by pointing the cursor at its normal size image and pressing select. The option 'O.k' is an exit from the menu without painting.

The 'Edit brush' option acts upon the current or last used brush. To edit a particular brush, you must first make it the current brush by choosing it from the 'Select brush' menu, then pulling down the Paint menu for a second time and clicking the 'Edit brush' option.



MISCELLANEOUS



The first option in this menu removes the menu bar from the top of the screen and allows you to view the entire 25 lines of your picture. Press the select button to return to the menu. Note that 'Undo' (see below) does not function after viewing the screen, but remember that you can always scroll a picture by clicking the up-arrow and down-arrow boxes to see the extra three lines and still retain the 'Undo' facility.

The second option clears the whole screen to the current background ink. 'Undo' is available if you clear the screen by mistake.

The next two options allow you to switch between the hi-res and medium-res screen modes supported by ART STUDIO. (To recap, mode 1 offers a resolution of 320 by 200 pixels in four colours, and mode 2 offers a resolution of 640 by 200 pixels in two colours.) Your picture is not lost when changing mode, it is converted to the new format. Obviously some compromises have to be made in doing this. In going from mode 1 to mode 2, half the colours in a picture are lost (with the standard palette, white and black are unchanged, red is changed to white, and blue is changed to black). In going from mode 2 to mode 1, no colours are lost, but the resolution is reduced (with the

consequential loss of fine detail). Note that you can always undo a mode change by clicking the 'Undo' box in the main menu bar. If a fresh start is required in the new mode, the screen can be cleared after the mode has been changed.

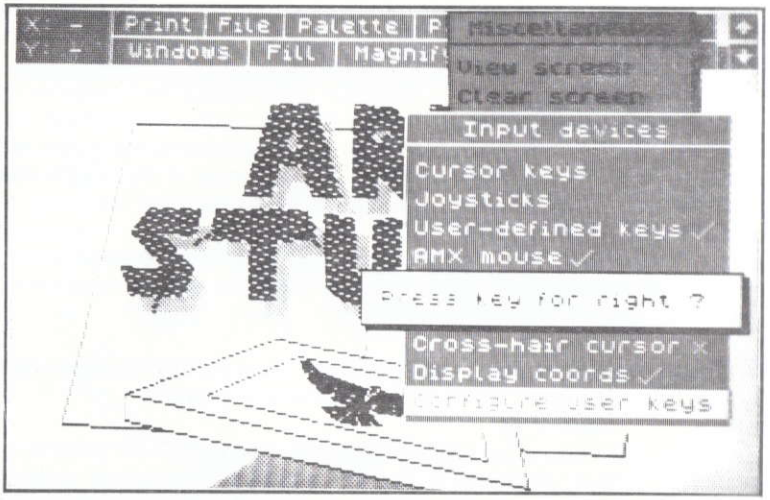
A grid lock is available in ART STUDIO, which locks the cursor to an imaginary grid on the screen. The grid is useful in aligning the components of a drawing. The lock can be set independently in the two axes, and at a number of graduations. For example, if the X-lock was set to 4 and the Y-lock to 8, then the cursor would be restricted to every 4th pixel horizontally and 8th pixel vertically. If a shape was being drawn at the time, then the vertices of the shape would be locked to those particular pixels. Note that the grid lock applies to painting, windowing, and text as well as shapes.

The next option pulls down a menu which controls the Input devices. This menu is dealt with in the section immediately below.

The option 'Save new copy' saves a personalised copy of ART STUDIO to the disc in drive A. The copy will be personalised in the sense of being saved with the state of the menu switches, the screen mode, the current palette, any edited textures and brushes, the RAM catalogue, and the current font all intact. Consequently, when the copy is loaded back, the system will be already set up for individual requirements. Make sure you have a formatted disc in drive A when selecting this option (DO NOT use the master disc supplied with ART STUDIO). Copies of ART STUDIO are loaded in the same way as the original, i.e. reset your CPC6128, then enter the command RUN "studio".

The final option in the Miscellaneous menu displays a copyright message and the release number of the particular version of ART STUDIO you are using.

INPUT DEVICES



This menu enables you to specify the input device for your copy of ART STUDIO, i.e. what actually moves the pointer around the screen. In fact, ART STUDIO allows more than one input device to be 'active' at the same time, two devices can act in 'tandem'. For example, a joystick might be used for most of the movement around the screen, and then the keyboard brought in for very fine pixel work. The program is initially set up to use the cursor (arrow) keys to move the pointer and the space bar to select options, in tandem with a joystick (joystick No.0 or No.1, either 'fire' button).

You can configure the program to use your own choice of five keys on the keyboard (four direction keys and select). The final option in this menu (see below) allows this. Once defined, the new arrangement of keys can be brought into play by clicking the 'User-defined keys' option. Note that the user keys are initially set to cursor keys and ENTER.

ART STUDIO also supports AMX and Kempston mice. A mouse is a far more sophisticated input device than a joystick or the keyboard, and allows much greater control over the movement of the cursor. Note that any of the select buttons on a mouse can be used to control the program.

Two cursor speeds are available, whether the pointer is being moved by the keyboard/joystick or by a mouse. The initial setting is the slower speed. To engage the faster speed, simply set the 'Fast cursor' switch to on.

You can elect to use a cross-hair cursor instead of the icon cursors (apart from the window and text cursors) by setting the 'Cross-hair cursor' switch to on. Icons are useful reminders of the 'mode' you are in, but experienced users may prefer the less cluttered cross-hair cursor. It is also easier to gauge the actual point of application of the latter.

The coordinates of the cursor can be continuously displayed in the top left-hand corner of the screen by turning the 'Display coords' switch on (the coords are only actually displayed when the cursor is not in a menu). These coordinates uniquely identify every pixel on the screen, and so are useful in positioning the cursor accurately. The origin of the coordinate system is the bottom left-hand corner of the screen (when fully scrolled up). The X-coord runs from 0 to 639 (in increments of two in mode 1 or one in mode 2), and the Y-coord runs from 0 to 398 (in increments of two in both modes). This is the same coordinate system as is used by BASIC. Recall that the SHIFT key in conjunction with the direction keys can be used to move the cursor a single pixel at a time.

The final option in the Input devices menu allows the user-defined keys to be reconfigured. Click this option and you will asked to specify the five keys, in the order corresponding to 'left', 'right', 'up', 'down', and 'select'. For each, press your choice of key. You should only use letter, number and punctuation keys, not CAPS LOCK, SHIFT etc. as these have other meanings.

UNDO

This is one of the most useful facilities in ART STUDIO as it undoes the effects of the last command or operation.

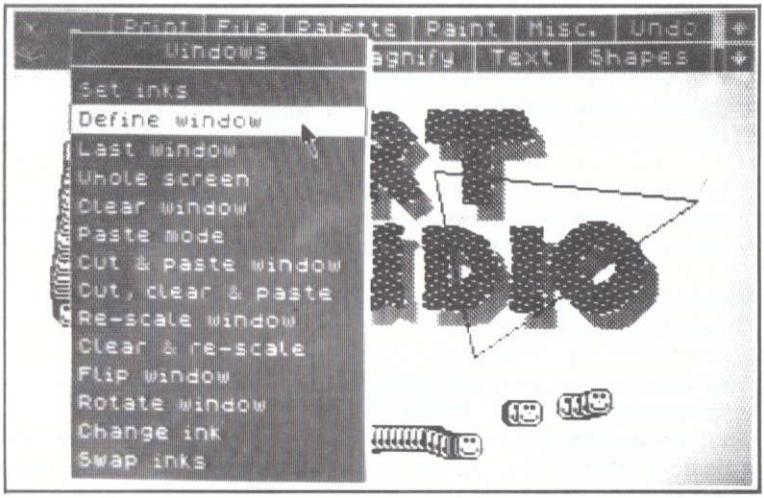
When a command such as 'fill' is selected, the main screen is automatically copied to a special back-up store. The fill operation is then performed on the main screen. If the result is not what's required, then clicking the 'Undo' box causes the back-up store to be restored to the main screen.

Note that this facility only works immediately after any change to the screen.

Undo will not change the current 'mode', in other words the current icon is not lost. If a window outline is on screen when Undo is selected, then it will be retained.

To avoid disappointment, it is important to appreciate exactly when the screen is 'backed-up'. As a rule, the screen is copied to its back-up store when a command in a pull-down menu that flashes is selected (defining windows is an exception to this). It is not backed-up when a menu switch is changed, or a new ink is selected. If in doubt, remember that you can always force a back-up by re-selecting the command.

WINDOWS



A window is a rectangular section of the screen, marked by a dotted outline, which can be acted upon as a whole. Windows can be cleared, moved, copied, smeared, re-scaled, flipped, and rotated. 'Undo' can be used after a window has been processed to reverse any effects.

Before any action can be performed on a window, it must first be defined. To define a window, pull down the menu from the 'Windows' box, move the cursor to the 'Define window' option and press select. The arrow cursor will be replaced by a small box cursor. Move this cursor about the screen and press the select button twice to define two opposite corners of the window. The outline of the window will be marked on the screen with a dotted line, and the cursor will turn back into an arrow. The Windows menu can then be pulled down for a second time and one of the window processing commands selected.

A window that is larger than the 22 visible lines of the screen can be defined by clicking the first corner, clicking one of the arrow boxes to scroll the screen, then clicking the second corner. The option 'Whole screen' defines the whole screen as a window. The option 'Last window' re-defines the last used window.

Clicking the option 'Clear window' clears all the pixels in a window to the current background ink, set from the Inks menu.

A window can be copied after being defined by clicking the 'Cut & paste window' option. A second window outline appears which moves as a whole with the cursor, and when the select button is pressed, the original window is copied to the new winow. Note that the second window is moved via the first corner defined in the original window.

The option 'Cut, clear and paste' is similar to the above with the addition of clearing the original window (to the current background ink) when copying it, i.e. it effectively moves a window.

The sub-menu 'Paste mode' contains a number of switches which affect the pasting of windows.

The 'Multiple' switch allows multiple copies of a window to be made. After pasting for the first time, the window outlines stay on screen, and can be used as many times as required. Set the switch to on before selecting the 'Cut & paste' or 'Cut, clear & paste' options to use this facility.

'Smear' is essentially an auto-repeat on the select button when pasting, and allows a window to be used like a paint brush. It is best in conjunction with small windows.

Normally a window overwrites the screen when it is pasted. It can, however, be combined or merged with the existing screen by selecting one of the 'Merge' options. If 'Merge OR' is set, pixels are combined on an OR basis. If 'Merge XOR' is set, pixels are combined on an XOR basis. Finally, if 'Merge AND' is set, pixels are combined on an AND basis. To turn off merging, re-select the 'Overlay' option.

'Exclude ink' is a powerful feature that excludes a particular ink when a window is pasted, in other words the ink is left behind. The ink to be excluded is defined as the current foreground ink. It is useful to exclude the background of an object being pasted, so as not to obscure the object's new surroundings.

A window can be enlarged, reduced, squashed, or stretched - actions collectively known as 're-scaling'. A window is re-scaled by clicking the 'Re-scale window' option, which gives the box cursor again and

allows a second window to be defined. The original window is then 'mapped' onto this second window, being re-scaled as necessary to fit into the new outline. Note that there may be some loss of fine detail when a window is reduced in size.

The option 'Clear & re-scale' clears the original window when re-scaling it. The switches in the 'Paste mode' menu (apart from 'Smear') apply to the re-scaling of windows in the same way that they apply to the cutting and pasting of windows.

Windows can be 'flipped' or mirrored about their horizontal and vertical axes by selecting the options in the 'Flip window' sub-menu.

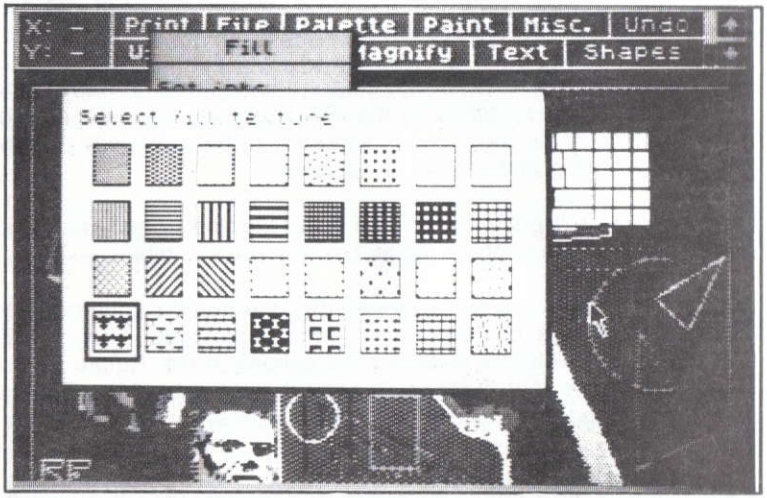
Windows can be rotated clockwise by one-quarter, one-half, and three-quarters of a complete turn (equivalent to 90, 180 and 270 degrees respectively) by selecting the options in the 'Rotate window' sub-menu. Note that a mode 2 window rotated by 1/4 or 3/4 will become distorted as a consequence of the non-squareness of pixels in that mode.

The function of the 'Change ink' option is to change one ink into another over the whole, or part of, the screen. Two inks are defined via the Inks menu, a source ink is specified as the background ink, and a destination ink is specified as the foreground ink. The option then converts all occurences of the source ink to the destination ink within the defined window.

The 'Swap inks' option takes two inks within a window and exchanges them. Again, the inks are defined via the Inks menu as foreground and background.

It should be realised that these last two options physically change the inks of pixels on the screen, and have nothing to do with the palette.

FILL

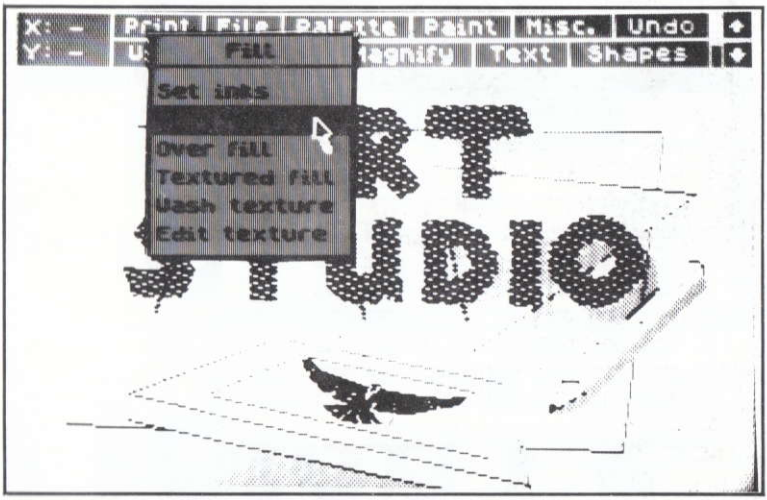


Filling is a technique for rapidly setting all the pixels within an object or shape on the screen. The object to be filled must have a continuous outline, but the outline can be quite complex. An object can be filled with solid colour or it can be filled with a pattern. A wide range of pre-defined patterns, or textures as they are known, is available. These include various stipples and hatches, and specialised patterns such as bricks and roof tiles. In addition, scratch patterns can be designed to suit individual requirements.

To fill an object solidly, move the cursor down the Fill menu until the 'Solid fill' or Over fill' option is highlighted and press select. The arrow cursor will be replaced by a representation of a paint roller. Move this cursor about the screen to some point within the object you wish to fill, then press select again. The fill will proceed outwards in every direction, in the current foreground ink, from the chosen point until the outline of the object or the border of the screen is encountered.

The distinction between 'Solid fill' and 'Over fill' is a subtle but important one, and rests upon their different 'boundary conditions'. A solid fill fills outwards until a pixel of a different ink to the starting

point is encountered. An over fill fills outwards until a pixel of the foreground ink is encountered. Both fills set pixels in the current foreground ink. For example, imagine a triangle on a white background with one side of the triangle black, another red, and the third blue. Selecting 'Solid fill' and clicking some point within the triangle, with black foreground ink set, will result in the triangle being neatly filled in black. Or, selecting 'Over fill' and clicking some point within the triangle, again with black foreground ink, will result in the fill going right over the red and blue sides and probably ending up covering the whole screen.

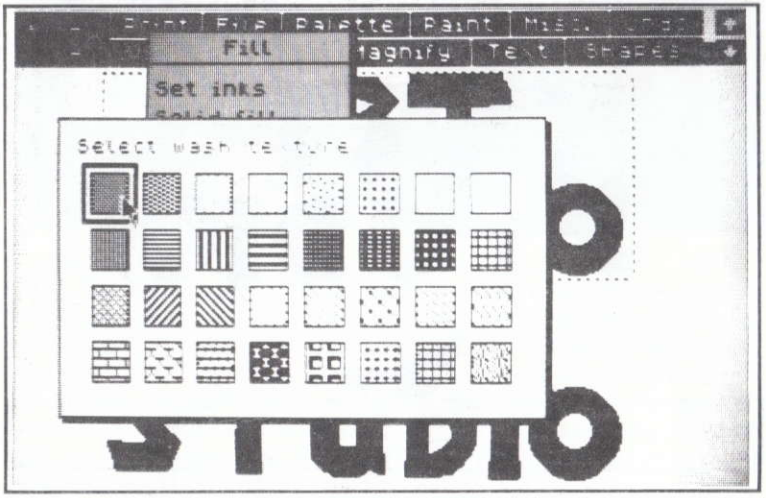


To fill an object with a pattern, move the cursor down the Fill menu until the 'Textured fill' option is highlighted, then press select to pull down a menu containing the 32 available textures. Click the desired texture, then click some point within the object to be filled. A textured fill is a two stage process. First an ordinary solid fill is done, then the chosen texture is 'mapped' onto all the pixels on the screen that have been set by the solid fill. A textured fill is done in the current foreground and background inks, set from the Inks menu. Either ink may be transparent.

Note that fills take place over the whole screen including the three lines not visible at any one time. The results of a fill can be checked by clicking the up-arrow and down-arrow boxes in the main menu bar to

see these extra lines. A fill can be aborted by pressing the ESC key. If a fill 'leaks' out of an object, or is in any way unsatisfactory, it can be removed by clicking the 'Undo' box.

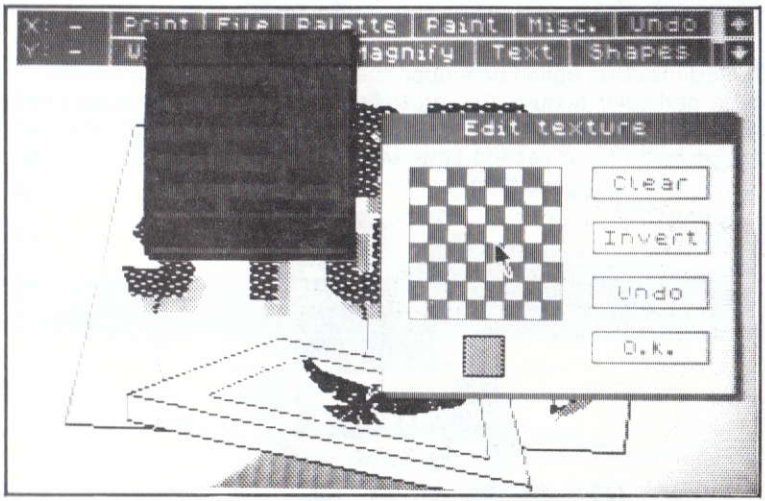
You may like to know that the fill algorithm is structured around an internal stack which stores line segments for the object being filled. Approximately 8 kilobytes of memory are available to this stack, but it is possible that very convoluted shapes may cause the stack to overflow. If this happens, ART STUDIO will not crash, but it may leave some small holes in the object being filled. However, this is hardly ever likely to happen in practice.



'Wash texture' is a versatile feature that effectively allows you to paint directly with a pattern. It uses the same menu of 32 textures as the above, and works by 'mapping' a chosen texture onto any pixels on the screen that have been changed by a previous operation. This process is essentially an extension of the second stage of a textured fill. Note that it only works immediately after pixels have been altered.

For example, you could draw a rectangle using the Shapes menu (see below), and then wash one of the stipple textures onto it to get a dotted outline. Or you could wash a striped texture onto a line of text for distinctive lettering.

Washing takes place in the current foreground and background inks, and again either ink can be transparent. It is possible to wash a texture onto the results of an over fill. With a transparent background ink, this is a powerful facility.



Each of the 32 textures can be edited to suit your particular requirements. To edit a texture, move the cursor down the Fill menu until the 'Edit texture' option is highlighted, then press select to pull down a menu containing a large scale representation of the texture and a sample of the texture at normal size (actually several copies of the texture so an idea of how it 'fits together' can be obtained).

The individual pixels in the enlarged texture can be altered with the arrow cursor. Positioning the cursor over a pixel and pressing select will toggle the pixel. Then, as long as select is held down, and the cursor is moved about, other pixels under the cursor will be changed in the same way as the first. For example, clicking on a set pixel will reset that pixel and reset any others until select is released, and clicking on a reset pixel will set the pixel and subsequent pixels until select is released.

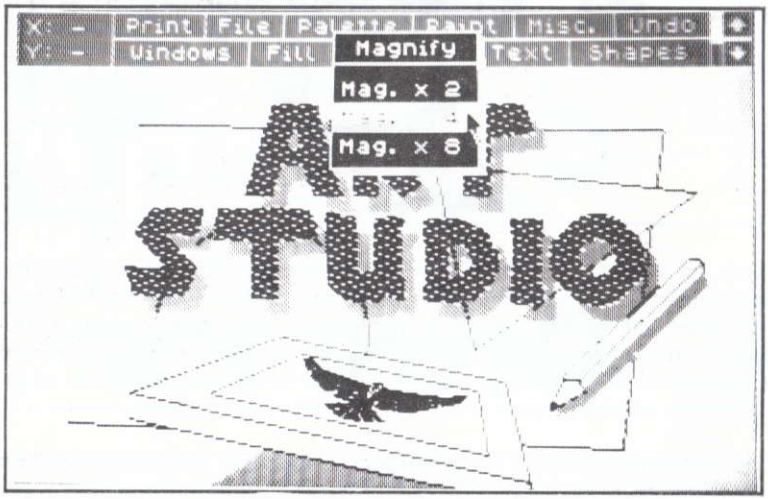
A couple of additional facilities are provided in this menu to make editing easier. They are, 'Clear' which resets all the pixels in the

texture, and 'Invert' which toggles all the pixels in the texture. The 'Undo' option cancels any changes made to the texture since the edit menu was last pulled down.

The newly edited texture can be used by clicking its normal size image. The option 'O.k.' is an exit from the menu without filling.

The 'Edit texture' option acts upon the current or last used texture. To edit a particular texture, you must first make it the current texture by choosing it from one of the 'Select texture' menus, then pulling down the Fill menu for a second time and clicking the 'Edit texture' option. Note that the current texture is marked with an outline.

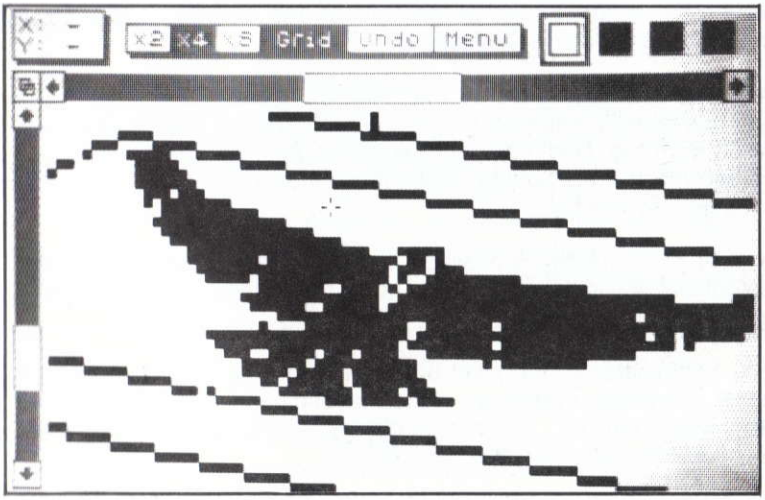
MAGNIFY



ART STUDIO allows areas of the screen to be magnified for detailed examination and alteration on a pixel by pixel basis. Three levels of magnification are available, with facilities to edit pixels and pan and zoom in each.

To magnify a section of the screen, pull down the Magnify menu from the main menu bar, then move the cursor down this menu until one of the options 'Mag. x 2', 'Mag. x 4', or 'Mag. x 8' is highlighted, and press select. The arrow cursor will change into a representation of a

magnifying glass. Move this cursor about the screen to the particular area you wish to magnify, then press select again. The main screen will be replaced by a magnified image of this section of your picture.



An individual pixel within the magnified section can be altered by positioning the cross-hair cursor over it and pressing select. The pixel will be changed to the current ink, which is shown outlined at the top right-hand corner of the display. The current ink is changed by clicking one of the four ink boxes. Note that the cursor can be moved while the select button is held down to alter pixels more rapidly.

As a convenience for keyboard users, the current ink can also be changed by pressing f0 to f3 when the cursor is in the magnified section.

The area to be magnified can be scrolled over the whole screen by clicking the boxes with arrows in them, or 'homed' by clicking the box containing the linked squares symbol. The scrolling auto-repeats if the select button is held down. Alternatively, clicking on the bars between the pairs of arrow boxes scrolls the screen directly. The white markers on these scroll bars show which fraction of the whole screen is currently being magnified.

As a convenience for keyboard users, the screen can also be scrolled by

pressing CONTROL and a direction key when the cursor is in the magnified section.

The magnification can be changed at any time by clicking one of the 'x2', 'x4', or 'x8' boxes at the top of the display. The current magnification is shown highlighted.

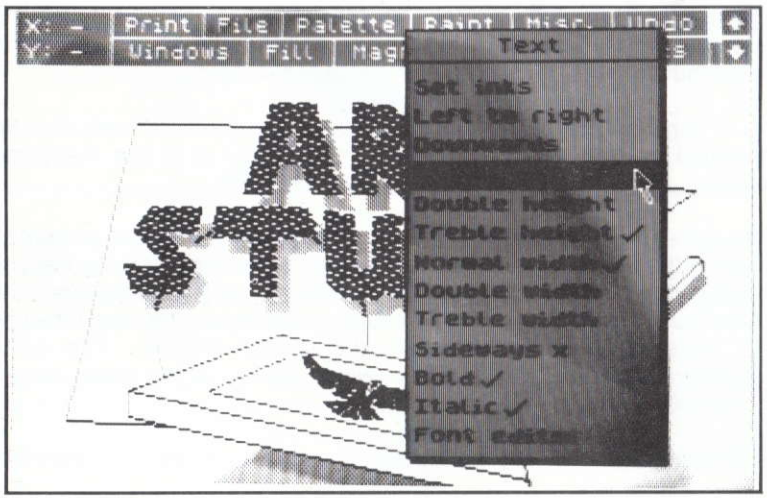
A grid is available in the x8 magnification mode - one square in the grid representing one pixel on the screen. This grid can be switched on or off from the 'Grid' option in the menu bar. Note that the pixels in screen mode 1 are square, whilst those in screen mode 2 are half as wide as they are tall.

A local 'Undo' facility is available to cancel any changes made to the magnified section, up until the point the screen is scrolled or the magnification is changed.

The coordinates of the pixel under the cross-hair cursor - using the same coordinate system as in the main screen - can be continuously displayed if desired. The coords display is switched on or off from the Input devices menu (see Misc. above).

When editing is complete, a return to the main menu is made by moving the cursor to the box marked 'Menu' and pressing select.

TEXT



This menu controls the addition of text - letters, numbers, punctuation etc. - to a picture. Text can be printed in two directions, to read from left to right, or to read from top to bottom, and individual characters can be printed in one of nine different sizes and in a number of different styles.

To add text to the screen, move the cursor down the Text menu until the 'Left to right' or the 'Downwards' option is highlighted, and press select. The arrow cursor will change into a cursor which looks like a capital I. Move this cursor about the screen to the point at which you wish to add your text, then press select again. The I cursor will be replaced by an underscore character, which is the text entry cursor. Type in your text using the keyboard. All the symbols marked on the keytops are available. If you make a mistake, the last character can be deleted by pressing DEL. All keys auto-repeat, and full cursor control (with wrap-around) is available using the cursor keys. The CAPS LOCK key functions as normal, as does the CLR key which clears the character under the cursor.

All characters are printed in the current foreground and background inks, set from the Inks menu. Either ink may be transparent, but note that, with a transparent background, DEL and CLR will be ineffective.

As each character is printed, the text cursor is advanced to the next character position, either immediately to the right, or immediately below, depending on the direction chosen originally from the Text menu. Pressing ENTER or RETURN terminates the input of text and recovers the I cursor.

Three character widths are available, labelled 'Normal width' to 'Treble width', and three character heights are available, labelled 'Normal height' to 'Treble height'. The ticks in the Text menu indicate which options currently apply. Combination of these widths and heights leads to a total of nine possible character sizes, ranging from short, fat characters to tall, thin characters. Note that the characters in mode 2 are half the width of the corresponding characters in mode 1 (because the pixels are half the width). However, the size of each character is reflected in the size of the capital I cursor.

Individual characters can be printed at normal orientation or sideways. The latter helps with the annotation of diagrams etc. To print

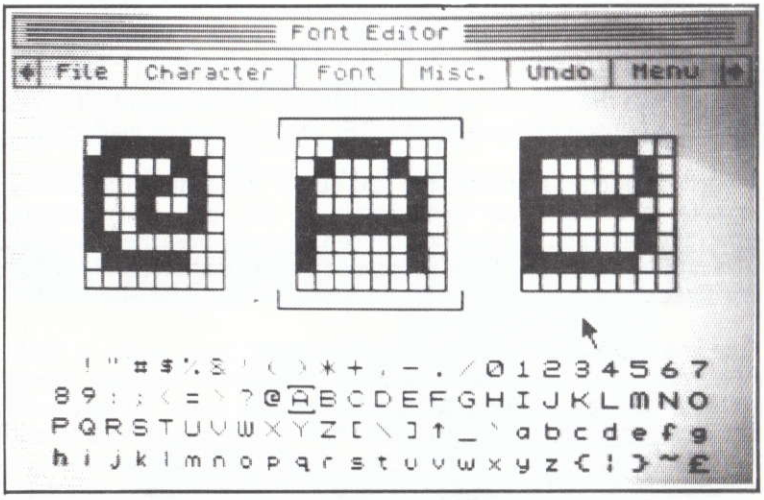
characters in this way, simply set the 'Sideways' switch in the Text menu to on before selecting 'Left to right' or 'Downwards' (or indeed after selecting).

Text can be in bold, where each character is printed twice, the second time one pixel to the right, and so appears to stand out. To print bold characters, set the 'Bold' switch to on.

Text can also be printed in italic, a forward slanting style, by setting the 'Italic' switch on. However, this does not always give satisfactory results for every character, so a separate italic font is included on the disc (see below).

Finally, the last option in the Text menu invokes a Font Editor.

FONT EDITOR



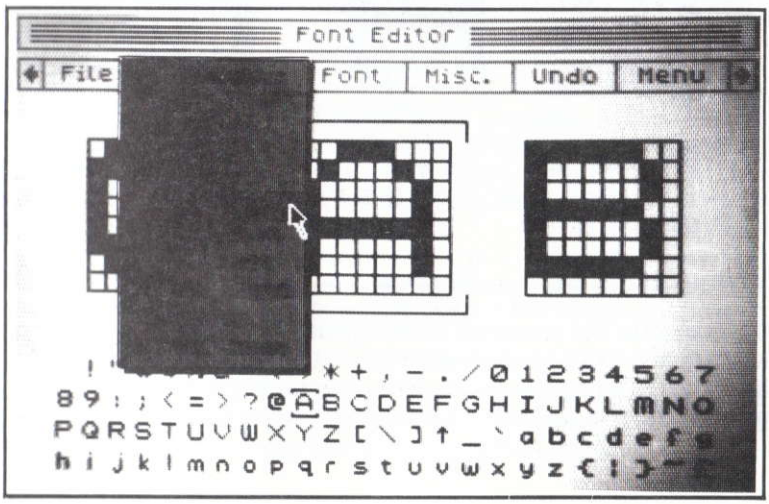
This menu allows you to edit the character set, or font as it is called, that the Text options use. There are 96 characters in a font, ranging from the space character to the pound symbol (ASCII 32 to 127). (Technically this last character is out of ASCII sequence but is included in this position so that there are equivalents in the font for all the symbols marked on the keyboard.) Whole new fonts can be created using this menu, or existing fonts can be altered. Fonts can be

stored on disc, and loaded into memory as required.

The 96 characters in a font are displayed at the bottom of the screen, each consisting of 8 by 8 pixels. One of these characters is the current character, this is marked by a top and tail cursor. The current character and the characters immediately to its left and right are shown in enlarged form above the font (3 enlarged characters in mode 1 or 7 enlarged characters in mode 2).

The individual pixels in these enlarged characters can be altered with the arrow cursor. Positioning the cursor over a pixel and pressing select will toggle the pixel. Then, as long as select is held down, and the cursor is moved about, other pixels under the cursor will be changed in the same way as the first. For example, clicking on a set pixel will reset that pixel and reset any others until select is released, and clicking on a reset pixel will set the pixel and subsequent pixels until select is released.

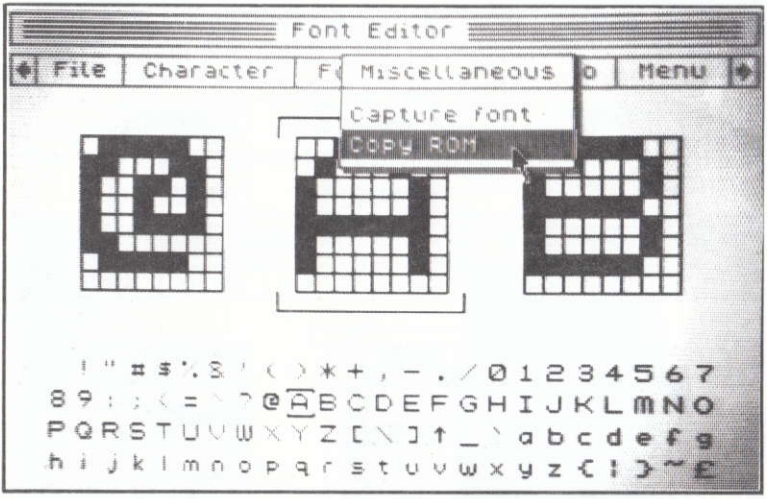
A particular character can be made the current character by pointing at it in the font at the bottom of the screen and pressing select. Alternatively the current character can be scrolled through the entire font by clicking the boxes with arrows in them. The scrolling auto-repeats if the select button is held down. As a convenience for keyboard users, the current character can also be scrolled by pressing CONTROL and a direction key.



There are a number of operations that can be performed upon the current character by pulling down the menu from the 'Character' box. These operations are:- clear (reset all pixels), invert (toggle all pixels), flip horizontal, flip vertical, rotate 1/4 (90 degrees clockwise), scroll left, scroll right, scroll up and scroll down (by 1 pixel). A character can be rotated by more than 90 degrees by selecting the rotate option two or three times, or scrolled by more than one pixel by repeatedly selecting the last four options.

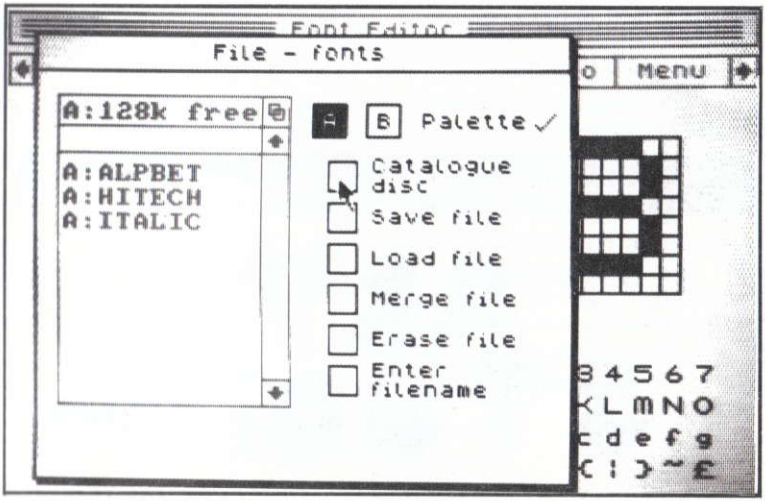
The same set of operations can be performed upon the font as a whole by pulling down the menu from the 'Font' box.

An 'Undo' facility is available within the Font Editor. This cancels any changes made to the character set, up until the point the current character is scrolled or an option in one of the pull-down menus is selected. For example, if the whole font was cleared by mistake, then clicking the 'Undo' box immediately afterwards would restore it.



The character set contained in the CPC6128's ROM (the characters available in BASIC) can be loaded into ART STUDIO's font by selecting the 'Copy ROM' option in the Misc. menu (this is the font that is in memory when ART STUDIO is loaded for the first time).

The 'Capture font' option in the Misc. menu is only highlighted if a window has previously been defined (see the section covering the Windows menu above). Its function is to copy blocks of pixels from the defined window on the screen into the font. Copying starts at the current character and proceeds left to right across the window, from top to bottom, until all the pixels have been used. In mode 1 the less significant ink bit determines whether a pixel is set or reset.



Fonts can be saved to and loaded from disc by pulling down the menu from the 'File' box. This is very similar to the file options in the main menu (see above) except that merge is not available, and, of course, only the font files on a disc are displayed (those with .FNT filetype). Note that there are 768 bytes (96 x 8) in a font, and ART STUDIO will refuse to load a file if it's larger than this value (it can be smaller though).

A number of sample fonts are provided on the supplied disc (including a special italic font). These fonts can be used in the design of your own pictures.

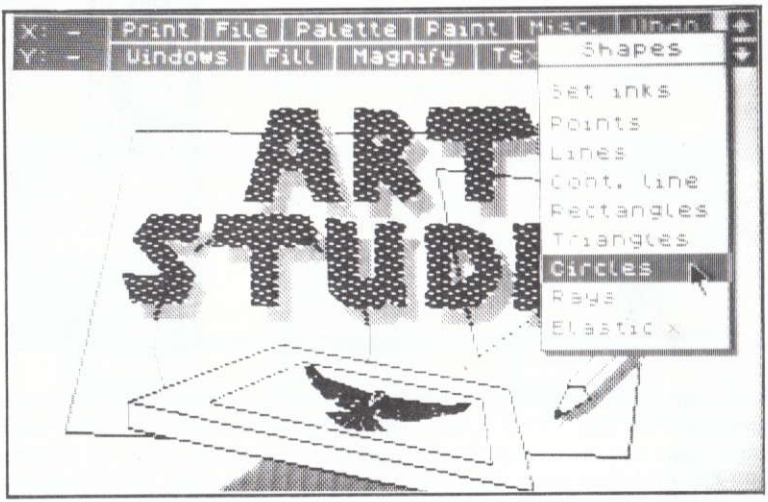
When editing is complete, a return to the main menu can be made by moving the cursor to the box marked 'Menu' and pressing select. The font created or loaded is then available via the Text menu.

Note that this font editor doesn't have to be used exclusively for ordinary letters and numbers. It could just as well be used for the creation and editing of user defined characters, or any other symbols that fit into an 8 by 8 grid.

Character sets that you have created using the font editor in ART STUDIO can be used in your own programs with the following routine:-

```
10 SYMBOL AFTER 32
20 x=HIMEM+1
30 LOAD "filename.fnt",x
```

SHAPES



This menu is used to draw various shapes on the screen. Seven different shapes are available, namely single points, lines, a continuous line, rectangles, triangles, circles, and rays. Each shape is composed of line segments of single pixel width. Shapes are drawn by moving the cursor about the screen and pressing select to define the vertices. All shapes are drawn in the current foreground ink.

For example, to draw a triangle, pull down the Shapes menu, then click the 'Triangles' option. Move the cursor about the screen, and press the

select button three times to define the three corners of the triangle.

A circle is drawn by pressing select once to define the centre, then pressing select a second time to define a point on the circumference. Note that circles are drawn over the whole screen, including the three lines not visible at any one time. An ellipse can be drawn by stretching a circle using the re-scale options in the Windows menu (see above).

Rays are line segments radiating out from a common centre point, the first point defined.

Multiple shapes can be drawn without needing to pull down the Shapes menu each time. ART STUDIO stays in 'shapes mode' until something else is selected.

Shapes can be drawn 'elastically'. An elastic shape moves with the cursor across the screen, expanding and contracting as necessary. Pressing select fixes the vertex of an elastic shape as before. This is helpful in getting a shape into the correct position before being committed to that position. To draw an elastic shape, set the 'Elastic' switch in the menu to on before selecting one of the shape options.

APPENDIX 1 - USER-DEFINED PRINTERS

Provision has been made in ART STUDIO to support printers not explicitly listed in the Print menu. The system is expanded via a printer parameter file, which is stored on the same disc as the working copy of the program (don't use the master copy). When ART STUDIO is booted, it looks for the parameter file on the disc, and loads it if present. This must be a 29 byte binary file with the filename "PRINTER.DEF". It can then be selected by setting the 'User-defined' option in the Print menu. The information needed to construct a parameter file for your printer should be contained in its manual.

Note that subsequent copies of ART STUDIO saved have the printer parameters built into them, and no longer need the parameter file on the disc.

The parameter file can be created with an assembler or with a short BASIC program. An example of the former, for Epson compatible printers, and an example of the latter, for the Amstrad DMP-1, are given below.

The first byte in the parameter file is a flags byte. Bit 0 of this byte is reset if the top wire in the print head is controlled via the most significant bit (m.s.b.) of data bytes sent to it, or set if it is controlled by the least significant bit (l.s.b.). For most printers, it is the m.s.b. Bit 1 of the flags byte is reset for Epson-type printers, or set for printers specifically designed for 7-bit Centronics ports (such as the Amstrad DMP-1).

The next eight bytes in the file are a set of control codes sent to the printer at the start of a screen dump. These control codes will typically be used to set the correct line spacing (7 dot spacing).

The next two bytes are the total number of dots across a printer page in single density mode, low byte first. These are followed by eight control codes to select single density mode. The control codes should be padded out to the left with nulls (zeroes), rather than to the right.

The next two bytes are the total number of dots across a page in double density mode, low byte first. If your printer has only one graphics mode, these two bytes should be zeroes. The final eight bytes are control codes to select double density mode. Again the control codes should be padded out to the left with nulls.

The distinction between Epson-type printers and 7-bit printers needs some elaboration. Epson-type printers are switched into graphics mode by sending a control sequence such as ESC K followed by the number of bytes of graphics data (number of dots) per line. This number is invariably greater than 255, so it must be transmitted as two bytes, the low byte first, then the high byte. At a single density resolution of 480 dots per line, this comes out as the numbers 224 and 1. The byte 224 cannot be sent through the 7-bit parallel port on the CPC6128. To overcome this problem, ART STUDIO splits pixel lines into groups of up to 127 bytes at a time (127 being the largest number in 7 bits) and precedes each group with the appropriate control codes. Consequently, the set of control codes in the parameter file for Epson-type printers do not need the two bytes for the number of dots as part of them. The DMP-1, on the other hand, is designed by some clever juggling not to need an eigth bit. It can transmit a complete line with only one set of control codes at the beginning. For these types of printers, the number of data bytes per line should be built into the set of (7-bit) control codes in the parameter file.

Assembler example :-

```
Parameters for Epson printers
    DEFB 0      ;TOP WIRE = M.S.B.
    DEFB 27     ;CONTOL CODES TO SET LINE SPACING AT 7/72"
    DEFB 65
    DEFB 7
    DEFB 0
    DEFB 0
    DEFB 0
    DEFB 0
    DEFB 0

    DEFW 480    ;DOTS IN SINGLE DENSITY MODE

    DEFB 0      ;CONTROL CODES TO SELECT SINGLE DENSITY MODE
    DEFB 0
    DEFB 0
    DEFB 0
    DEFB 0
    DEFB 0
    DEFB 27
    DEFB 75
```

```
        DEFW 960    ;DOTS IN DOUBLE DENSITY MODE
        DEFB 0      ;CONTROL CODE TO SELECT DOUBLE DENSITY MODE
        DEFB 0
        DEFB 0
        DEFB 0
        DEFB 0
        DEFB 0
        DEFB 27
        DEFB 76
```

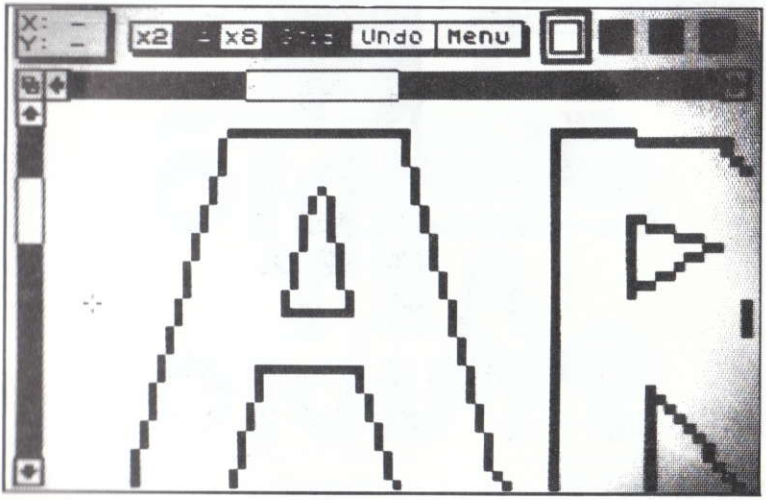
BASIC example :-

```
10  REM Parameters for Amstrad DMP-1
20  FOR a=32768 to 32768+28
30  READ b
40  POKE a,b
50  NEXT
60  SAVE "printer.def",b,32768,29
100 DATA 3,0,0,0,0,0,0,0,0
110 DATA 224,1,0,0,0,0,27,75,3,96
120 DATA 0,0,0,0,0,0,0,0,0,0
```

APPENDIX 7 - WORKED EXAMPLE

Finally we present a worked example showing the stages of construction of a picture and demonstrating some of the effects that can be achieved using the facilities of the ART STUDIO.

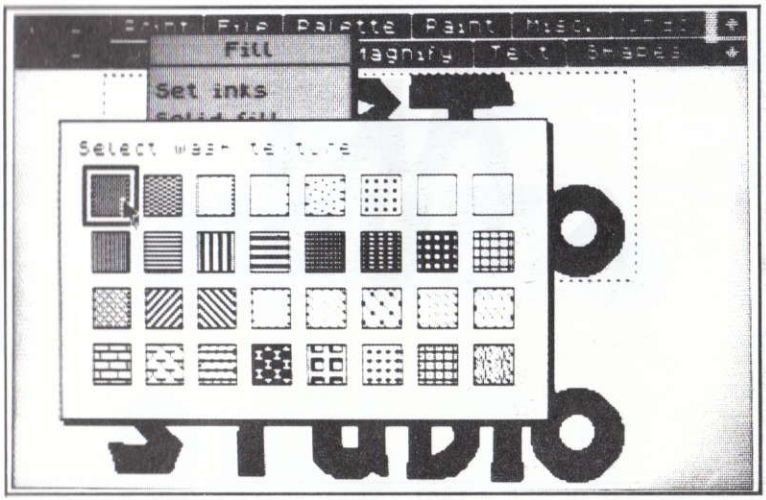
We start with some outline lettering drawn by using the lines option in the Shapes menu.



The Magnify facility can be used to 'touch-up' the letters. Here we are using a x4 magnification, although a higher magnification is available if required. The cursor is used to alter the individual pixels that comprise the letters.

The letters can now be filled in using the paint roller icon.

A window has been put around the completed text and a copy of it made by clicking the 'Cut & paste' option in the Windows menu.

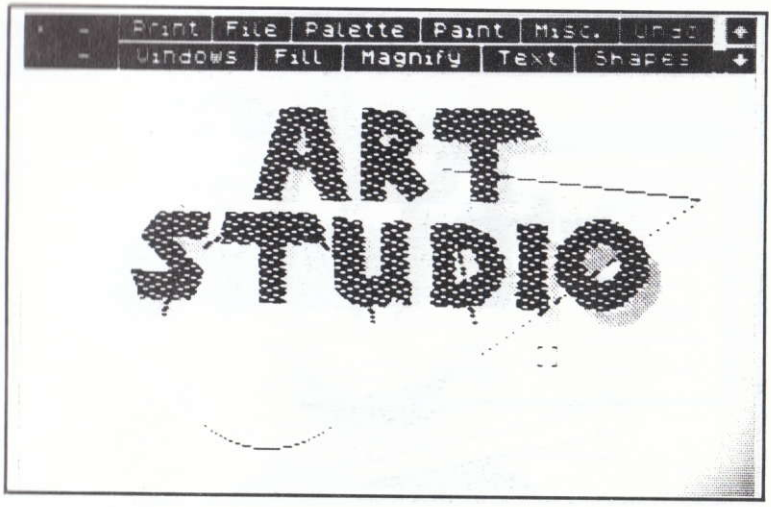


Immediately after this the 'Wash texture' menu has been pulled down, and one of the stipple patterns selected.

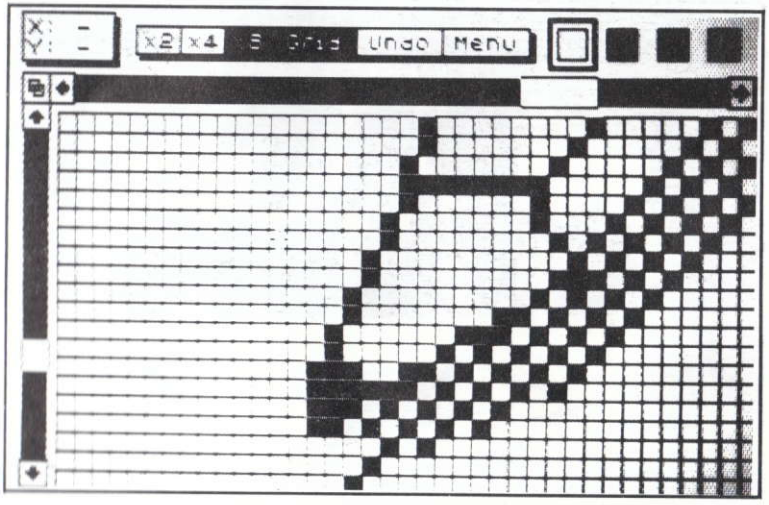
The effect of this operation is that the chosen texture is washed onto the bottom set of letters.

Again a window has been defined around the lettering, and the 'Cut & paste' option selected from the Windows menu (this time with the 'Merge' switch set to on). The second window outline is carefully positioned over the stippled lettering so as to slightly offset it and the select button pressed. The solid lettering is merged with its shadow.

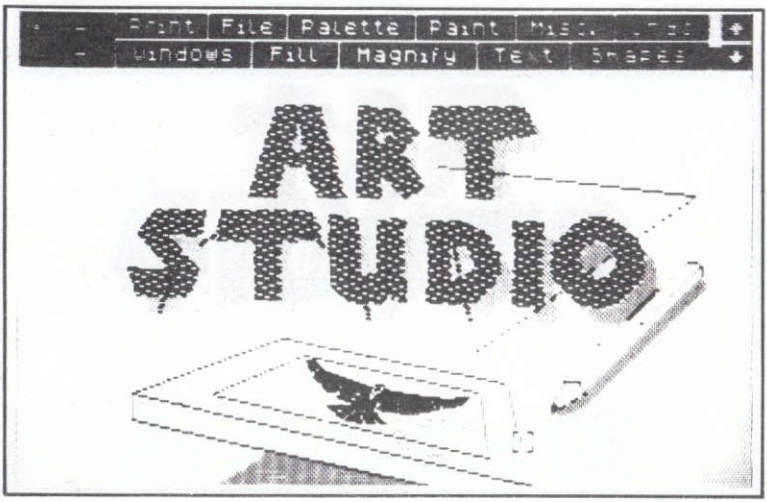
The 'Wash texture' facility has been employed for a second time to add a pattern to the top set of lettering, but this time a denser stipple has been used. This gives a pleasing three-dimentional appearance to the letters.



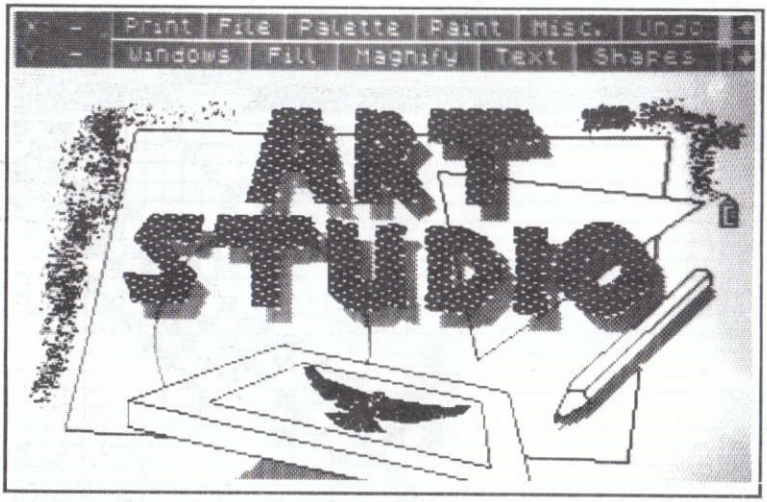
Some detail is being added to the picture with an elastic line using features from the Shapes menu.



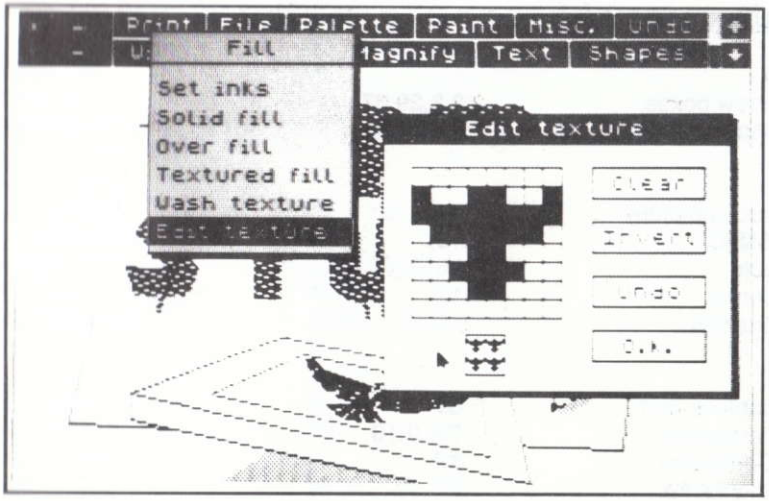
Here the x8 magnification grid is being utilised to add further detail to a pencil design.



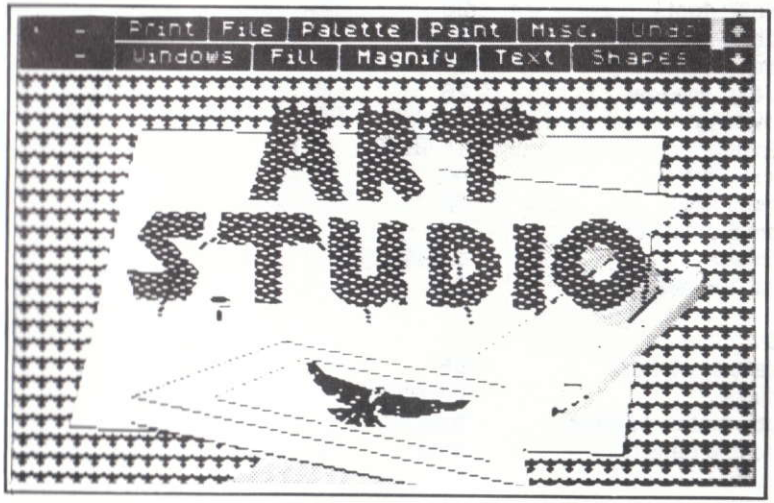
Here more detail has been added with elastic lines and a more complicated bird design with the magnification modes.



At this point we can try out a few possibilities. For example, using a spray can to add some random patterns to the outside of the picture.



If we decide we don't like this last move, we can simply click the 'Undo' box to remove it, and try something else, like designing a new texture and then filling the screen with it.



Although many of the features of ART STUDIO are not covered in this short worked example, we hope it gives you some idea of the potential of the program.

INDEX

RAINBIRD SOFTWARE . WELLINGTON HOUSE
UPPER ST MARTIN'S LANE . LONDON WC2H 9DL